On the Agaric Genera *Hohenbuehelia* and *Oudemansiella* Part II: *Oudemansiella* Speg.

E.J.H. Corner

91 Hinton Way
Great Shelford
Cambridge CB2 5AH
England

Abstract

This is mainly an account of Malesian species, of which *O. crassifolia, O. lianicola* and *O. submucida* are new, but notes are added on several temperate and South American species. The structure of the pileus introduces a new criterion into the specific classification of the genus. The connection with marasmioid *Xerula* is discussed. A species from Japan, referred tentatively to *O. radicata* var. *hygrophoroides* (Sing. et Clemençon) Pegler et Young is intermediate in that it has the marasmioid subacerose basidioles in the hymenium. It is re-affirmed that the pleurocystidia conform with the basidiograph locus of *Oudemansiella* and it is suggested that the narrow basidia of *Hohenbuehelia* and *Pleurotus* and the subacerose basidioles of *Marasmius* correspond with the developing and uncharged basidia of *Oudemansiella*.

Contents

Recent publications on this genus have enabled me to prepare this account of five Malesian species. In 1929, soon after I arrived in Singapore, I was intrigued by two common agarics. One I identified as *Collybia apalosarca*, now known to be one of the many synonyms of *O. canarii*. The other I called uncertainly *C. radicata* and it has passed unidentified, but I know now that it is *C. altissima* Mass., described from Singapore; the trouble in those days was the inadequacy of conventional description, as well as mistrust of the erratic mycologist George Massee. I have added three new species, mainly from later collections which I made in Borneo.

Oudemansiella, though very unlike the majority of marasmioid fungi in general appearance, now appears as the remains of the ancestry of Marasmieae and as a connection with *Pleurotus*. The genus is distinguished by the fleshy fruit-body, commonly with viscid brown to white pileus, the central stem, the large white inamyloid spores with a single large oil-drop or many small ones, the large

cheilo- and pleurocystidia, the long-celled thin-walled hyphae with clamps, the palisade of clavate cells on the pileus, and the lignicolous habit, though there may be exception in one point or another. Seventeen species, some with several varieties, are recognised by Pegler and Young (1986), to which Redhead, Ginns and Shoemaker (1987) add four others, but some of these are reduced by Boekhout and Bas (1986). The ultra-structure of the spore-wall has been studied in detail by Pegler and Young.

Classification of *Oudemansiella*

For various reasons but chiefly because it omits the structure of the surface of the pileus, I find that the revised classification of the species by Pegler and Young (1986) is unsatisfactory. My criticism arises mainly from consideration of the tropical species.

Subgen. *Oudemansiella* is separated from subgen. *Xerula* by reason of habitat, gelatinisation of the pellicle on the pileus, and manner of development. The habitat is given as lignicolous versus radicicolous but, as roots are also lignified, it is a distinction between growing on stem-wood rather than root-wood. This distinction holds in the main, as with *Amauroderma* contrasted with *Ganoderma*, but there may be anomalies such as that concerning *O. brunneimarginata* mentioned under *O. raphanipes*. Imai (1938) reported *O. radicata* on decayed wood above ground in Hokkaido. With this distinction there is coupled the presence of the pseudorhiza, said to be peculiar to subgen. *Xerula*, but there is *O. radicata* f. *arrhiza* Lange (1936) as well as the state of the species on stem-wood without the pseudorhiza, and in subgen. *Oudemansiella* there is *O. canarii* f. *radicans* that grows on wood above ground. The pseudorhiza is a facultative rhizomorph indicated, probably, by the basal plug by which all the fruit-bodies are attached to stem-wood. Concerning the gelatinisation of the pellicle, it occurs in both subgenera and is absent from some species in both, as in *O. lianicola*, which could be placed in subgen. *Oudemansiella* because it grows on stem-wood without a pseudorhiza.

Development of the fruit-body is described as bivelangiocarpic in subgen. *Oudemansiella*, according to Reijnders (1948) and as gymnocarpic in subgen. *Xerula*. The term bivelangiocarpic in this context is misleading because it implies a universal veil and a partial veil and, at most, so far as I know, there is only a partial or marginal veil in the genus. Indeed, Reijnders (1952) called *O. canarii*, which is supposed to be conspecific with the type of the genus *O. platensis*, metavelangiocarpic because what slight veil it has is formed by the union of outgrowths from the margin of the pileus and the base of the stem (Corner, 1934). Supposedly, the palisade on the pileus and the loose hyphal outgrowth on the stem are taken to be the universal veil, but I regard them as just the surface of pileus and stem in a gymnocarpic primordium; to regard them as adnate veils, as velangiocarpic implies, is like regarding the hair on one's head as a veil. This

marginal veil certainly supplies the ring on the stem of *O. mucida* and that, not always present, of *O. submucida*. In *O. canarii* it is vestigial, and there may be a trace of it in *O. radicata* of subgen. *Xerula* according to Reijnders (1952), as in *O. lianicola*, but with no vestige in the expanded fruit-body. In fact, the presence or absence of this marginal veil can be proved only by microscopic study of very young primordia and it is not clear that this has been accomplished. It is unreasonable to ascribe two veils to *O. mucida* and none to *O. radicata* when both have the same kind of structure for the surface of the pileus. Thus, I regard *Oudemansiella* as gymnocarpic with or without a marginal veil.

Surface-structure of the Pileus

This matter seems to me to supply the most important means for specific arrangement in the genus. I distinguish five states, as follows.

1. The double palisade, with an outer palisade separated from an inner palisade by a thick gelatinous layer.

   A. The outer palisade developing moniliform rows of cells (mainly by secondary septation) to form a trichoderm, e.g. *O. platensis* (subgen. *Oudemansiella*).

   B. The outer palisade remaining a single layer, e.g. *O. canarii* (subgen. *Oudemansiella*).

2. A single palisade, with or without a thin mucilaginous hypodermis.

   A. The palisade developing moniliform rows of cells (mainly by secondary septation), e.g. *O. lianicola* (subgen. *Oudemansiella* in habitat, subgen. *Xerula* in lacking a gelatinous layer).

   B. The palisade remaining a single layer of clavate cells, with or without ventricose-filiform pileocystidia. e.g. *O. mucida* and *O submucida* (subgen. *Oudemansiella*) and probably most species of subgen. *Xerula.*

3. No palisade but a fairly thick gelatinous layer, e.g. *O. crassifolia* (subgen. *Oudemansiella* in habitat).

Nevertheless, it is not clear that all these differences are absolute. Thus, in *O. altissima*, the structure of the central part of the pileus places it in Group 2A and that of the outer part in Group 2B (Corner, 1934, figures 8, 9). Then, the lack of palisades in Group 3 may not hold for the unexpanded primordial pileus which may have a slight palisade of clavate cells soon to become disrupted. Indeed, disruption of the outer palisade on expansion in pilei of Groups 1A and 1B causes the flecks on the gelatinous surface which are easily washed off by rain so as to give the appearance of Group 3 but with the inner palisade intact. Thus, in *O. platensis* and *O. canarii*, the true construction is not usually evident in mature fruit-bodies.

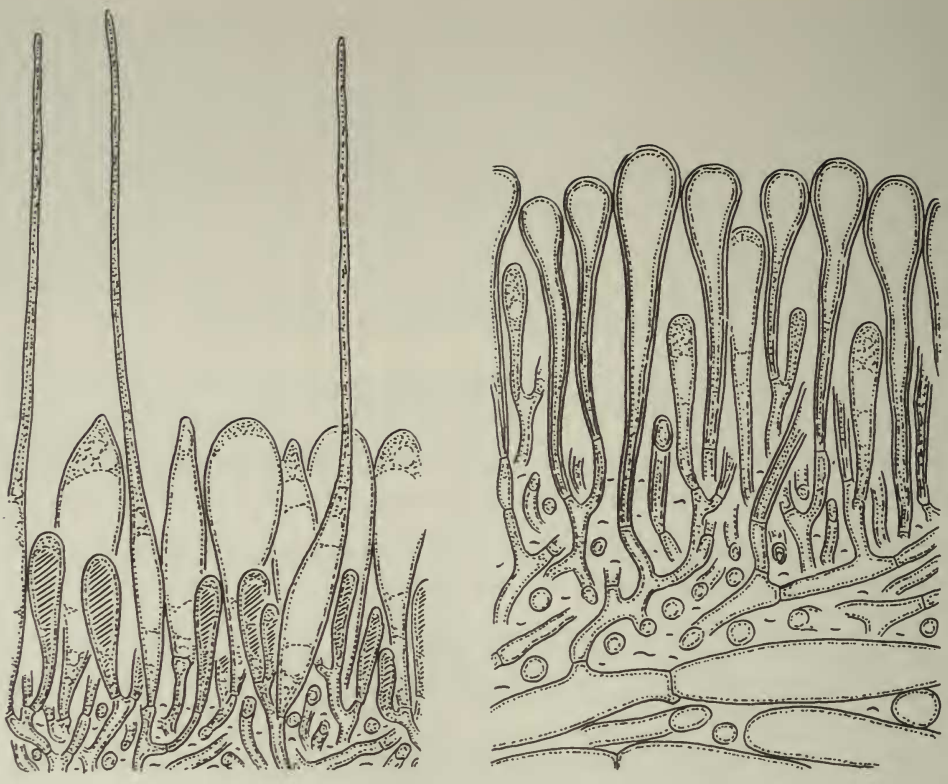


Figure 1. *Oudemansiella altissima* (left) and *O. radicata* (right). Surface of central part of pileus, x 500.

It emerges that *O. mucida* and *O. submucida* have the structure prevalent in subgen. *Xerula* though, in respect of habitat and development, they agree with subgen. *Oudemansiella*. The surface-structure cuts up the distinction between the two subgenera.

Another issue concerns the presence of clamp-connections. They occur in all the hyphae of the fruit-body but in most species that I have studied they are absent from the hyphae of the one or two palisades. They are described as present in the palisade for *X. furfuracea, X. megalospora* and *X. rubrobrunnescens* by Redhead, Ginns and Shoemaker (1987), and some of the hyphae of the palisade in *O. lianicola* are clamped. Whether the absence of clamps reflects an antecedent state with moniliform secondary septation to form a trichoderm is not clear, but I certainly consider that the trichoderm of *O. platensis* is antecedent to the single outer palisade of *O. canarii*, just as the trichoderm resolves into the hymenioderm in other basidiomycetes.

Actually, what appears as a single palisade in *O. altissima*, perhaps also in *X. caussei* and *X. kuehneri* according to Boekhout and Bas, is more complex and, in its way, triple (Corner, 1934, figure 8). There is the main layer of large clavate

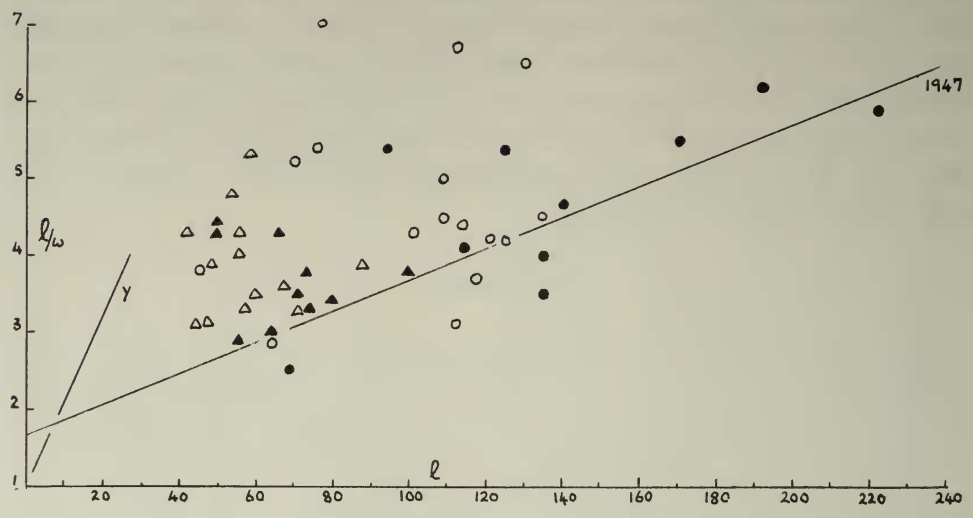
cells beyond which project the ventricose-filiform pileocystidia, and between the stalks of these cells there are shorter, narrower, clavate or cylindric cells with brown sap. From this construction, there emerge the other main kinds. In the simplest case, the palisade reduces to a truly single layer of cells. That of *O. canarii* adds a gelatinous layer between the small, inner and brown cells and the others, and in *O. platensis* this is complicated by secondary septation of the hyphal ends in the outer palisade.

The Stem

In *O. mucida* and *O. submucida* the ring lies at or above the middle of the stem but the vestige of the ring or marginal veil is on the upper side of the bulbous base of the stem in *O. canarii* and *O. platensis*. The explanation is provided by *O. canarii* var. *perstipitata*. The stem of *O. canarii* corresponds with the supra-annular part of the stem of *O. mucida* (Corner, 1934, figure 11). That illustration showed how the aerial stem of species with a pseudorhiza may similarly correspond with the supra-annular part of *O. mucida*. Thus, it may be that the primordia of the fruit-bodies of subgen. *Xerula* are formed at the surface of the ground in a button-stage similar to that of *O. canarii* with or without a trace of marginal veil. The idea is supported by the fact that the pileus is not acutely conical in *Oudemansiella*, for such is usually the case with pilei initiated below ground and forced through the soil to the surface. However, Buller (1931) found the primordia of *O. radicata* were formed on the root and were pushed by the pseudorhiza to the surface of the ground. I think that the problem still needs investigation.

Basidia and Pleurocystidia

In 1947 I showed that both the mature basidia and the pleurocystidia of *Oudemansiella* conformed to the same locus on the basidiograph that had for its definition $l/w = 1.7 + 0.02l$, giving a maximum width of 50 μm. More data have come to hand and the revised basidiograph is shown in Graph 1, along with the original locus. I see no reason to alter its slope though an upward shift in the value of the ordinates to 1.8 or 1.9 might assimilate more points. They, however, are species-points, based on mean values, whereas my original data were based on averages; thus, a basidium not fully expanded will give a higher value for l/w than one that is, and it is very easy to be deceived by this detail in a specific description. Moreover, as the basidia in some species are dimorphic, more detailed enquiry is needed to discover if there is any difference in this matter between the long and short basidia. However, Buller gave the basidia of *O. radicata* as monomorphic. For the initial stage of enlargement of the basidium up to 27 μm long and before it began to be charged with dense cytoplasm, the locus was $l/w = 1 + 0.11l$, and this corresponds with that of the narrow basidia of *Hohenbuehelia* and *Pleurotus* (Corner).



Graph 1. *Oudemansiella,* basidograph (triangles) and pleurocystidiograph (circles), based on the data in this article (solid triangles and circles) and on those from the authors cited. 1947, the locus based on average data (Corner, 1947). y, the basidiograph for developing basidia.

The presence of subacerose basidioles in the hymenium of the fungus here described as *O. radicata* var. *hygrophoroides* necessitates closer study because, in this respect, it connects with *Xerula* based on *X. longipes* (Corner, in ed.). If its species-point on the basidiograph is reliable, then its basidia are tending, like those of *X. longipes*, to the narrow basidia of *Marasmius*, but its pleurocystidia are typically those of *Oudemansiella*. It seems that the subacerose basidiole, comparable in size with the developing and uncharged basidia of *Oudemansiella*, have supplied the steeper locus for the basidia and pleurocystidia of *Marasmius*, where $l/w = 1 = 0.21l$ to $1 = 0.071l$ with maxima as 5 μm and 14.1 μm respectively.

I note that the flattened or subtruncate apex of the pleurocystidium in some species may be the effect of pressure upon the adjacent gill in the crowded state of the primordial pileus, as seen in *Coprinus* and *Pluteus*.

Monomitic or Sarcodimitic

The hyphal construction of the fruit-body in *Oudemansiella* has always seemed to me to be monomitic with long-celled inflating hyphae together with relatively few uninflated hyphae. Thus, the texture is fleshy and the stem solid. Recently, however, it has been proposed by Boekhout and Bas (1986) and by Redhead (1987) that the stem and gills are sarcodimitic, as I described for *Trogia*. I have discussed this matter in a second account of *Trogia* (Corner, 1991) and prefer my original conclusion. The waxy-cartilaginous consistency and hollow stem of

Trogia are not features of *Oudemansiella* and, if the long cells of this and some other genera of agarics may be the precursors of the inflated fusiform skeletal cells of *Trogia*, they are not specially differentiated.

Affinity of *Oudemansiella*

It is generally agreed that *Oudemansiella* should be referred to Marasmiaceae (Romagnesi, 1977) or Tricholomataceae tr. Marasmieae (Singer, 1975). It is put in an allied family Xerulaceae by Jülich (1981), which covers *Oudemansiella*, *Xerula* and *Lampteromyces*. This last genus is put in Tricolomataceae tr. Clitocybeae by Singer but, as I have shown (Corner, 1981), it is impossible to distinguish clearly *Lampteromyces* from *Pleurotus*, and the custom now is to put *Pleurotus* far away in or near Polyporaceae, though it lacks entirely the peculiar hyphal construction of its key-genera *Polyporus* s. str. and *Lentinus* s. str. (Corner, 1984).

The idea of Xerulaceae has been greatly enlarged by Redhead (1987) who considers it to be essentially a sarcodimitic family that ranges into the monomitic. Thus, he places in it *Trogia*, *Oudemansiella*, *Xerula* and *Mycena*, but not *Lampteromyces* or *Marasmius*. If the sarcodimitic origin is so essential, then the polyporoid *Meripilus* must be added or given an allied family, though polyporoid allies of *Mycena* are, apparently, not to be excluded. However, as already mentioned, I am far from convinced of this aggregation, and the affinity of *Xerula* with *Marasmius* is confirmation.

Xerula is based on *X. longipes* or, as it is now called *X. pudens*. It has the marasmioid dry pileus, subagglutinated surface to the stem, acerose basidioles, and thick-walled caulo- and pileo-cystidia, but it has, also, the fleshier texture, large guttate spores, long-celled stem-hyphae, and the lack of clamps from the palisades of stem and pileus as in *Oudemansiella*. In size of basidia and pleurocystidia it comes between *Marasmius* and *Oudemansiella*. While this confirms the alliance of *Oudemansiella* with Marasmiaceae, it still leaves the fleshy consistency and lack of acerose basidioles as distinctive. This last point is bridged by the fungus here described as *O. radicata* v *hygrophoroides*. It joins *Oudemansiella* with *Xerula* which joins with *Marasmius*, without the intrusion of *Trogia*. *Lampteromyces* links *Pleurotus* and *Oudemansiella*. Here is a range from lignicolous on root and stem to humicolous and foliicolous fungi, and from typically agaricoid to stereoid, in the exploitation of the saprophytic habitats of the forest, parallel with the alliance of *Trogia*.

Here is confusion in the modern classification of Agaricales, which I do not attempt to amend while there are still so many gaps in knowledge and so much more to be discovered in the tropical flora.

Since this paper was written, a European fungus, first described as *Hydropus mediterraneus* Pacioni et Lalli (1985), has been transferred to *Flammulina* by

Bas and Robich who give a detailed description (Persoonia 13, 1988, 489), and most recently to *Oudemansiella* by Ortega, Vizoso and Contu (Documents mycologiques f. 82, 1991, 25). This genus was rejected by Bas and Robich on the ground that Redhead had decided that *Oudemansiella* was sarcodimitic, which I regard as a mistake. The species seems to come between *Xerula* and *Oudemansiella*. If it can be fitted into *Flammulina*, here is another instance of superfluous genera.

Key to the Malesian species of *Oudemansiella*

1. Terricolous with rooting base from buried wood. Pileus dry. Stem fuscous brown scurfy fibrillose .... *O. altissima*

1. Lignicolous above ground.

   2. Pileus at first with a gelatinous pellicle 0.3-1 mm thick, with white to greyish flecks washing off with rain, dark umber, paler to whitish on expansion. Common ..... *O. canarii*

   2. Pileus dry or with a much thinner gelatinous pellicle, without superficial flecks.

      3. Stem with a membranous ring. Pileus smeary viscid, white to pale ochraceous. Borneo .... *O. submucida* (pileus dry ..... var. *persicca*)

      3. Without such a ring.

         4. Gills very thick, obtuse. Pileus -3 cm wide, with a thin viscid pellicle, white. Spores 21-28 x 19-24 µm. Borneo ..... *O. crassifolia* (pileus -6 cm wide, dry, pale pink as the stem); spores 19-24 µm. Malaya ..... v. *incarnata*)

         4. Gills rather thin. Pileus -3 cm wide, dry, pallid ochraceous with subferruginous and strongly reticulate centre. Spores 10.5-13 x 8.5-9.5 µm. On dead lianes. Borneo ..... *O. lianicola*

Oudemansiella altissima (Mass.) comb. nov. Figures 1, 2

***Collybia altissima* Mass., Kew Bull. 1914, 358.- *C. radicata*, Corner in Trans. Brit. mycol. Soc. 19 (1934) 64, f. 8-10.**

Pileus 1-12 cm wide, convex then plane or concave, often subumbonate, dry (slightly viscid in decay), smooth or more or less extensively regulose-reticulate or rugulose rivulose, pale fuscous brownish or pale umber with darker centre; margin substriate, often slightly sulcate-crenulate. Stem 6-14 cm x 3-8 mm at the apex, 5-16 mm at ground level, with tapering root -16 cm long arising from a slender white rhizomorph 0.5 mm wide, fibrous, dry, concolorous, wholly fuscous brownish scurfy pruinose or subfibrillose but the white apex pruinose; veil none. Gills sinuate to adnexo-adnate, subdistant, rather thick and waxy, 13-33 primaries 4-12 mm wide, 3-5 ranks, not veined, white, sometimes with umber brown edge. Flesh 3-7 mm thick in the centre of the pileus, sappy, without a gelatinous layer, white. Smell sour.

On the ground, solitary or occasionally 2-3 together, from buried roots in the forest. Malesia to the Solomon Islands, uncommon, lowland to 1700 mm alt.

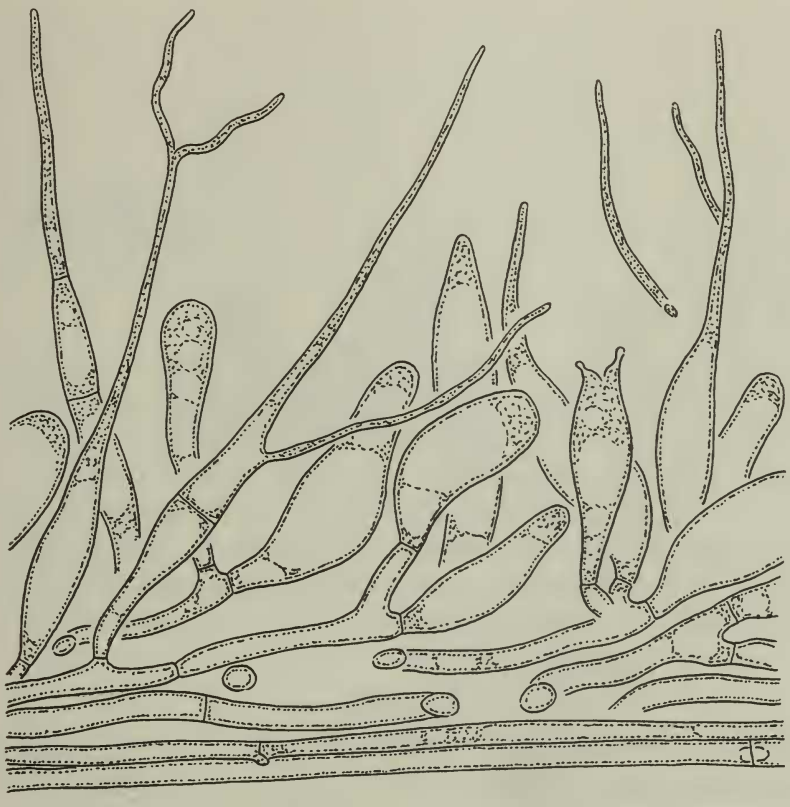


Figure 2. *Oudemansiella altissima.* Surface of lower part of stem, x 500.

Spores 15-19 x 12-15 µm, in some collections 11.5-15.5 x 11-14 µm, white, smooth, subglobose, the wall 0.3 µm thick, multiguttulate. Basidia 58-75 x 13-18 µm; sterigmata (2-)4, 6-10 x 3-4 µm, 9-13 x 4-6 µm on 2-spored basidia and sometimes with an abortive third sterigma; no acerose basidioles; subhymenium not corticate. Cheilocystidia as in *O. canarii*, clavate to ventricose and shortly appendaged, in some collections with brown sap. Pleurocystidia 80-190 x 18-50 µm, clavate to ventricose with a long obtuse appendage as in *O. canarii*, thin-walled. Hyphae clamped in both 2- and 4-spored fruit-bodies, but without clamps in the palisades on pileus and stem; in the stem strictly longitudinal with firm walls, the cells 100-1200 x 5-38 µm, cylindric with broad septa or with tapered ends, with few uninflated interweaving hyphae; oleiferous hyphae 3-9 µm wide, scattered. Surface of stem with loosely appressed and entangled longitudinal hyphae 3-9 µm wide, without clamps, with brown sap, ending with clavate to ventricose, often secondarily septate, cells 25-75 x 8-25 µm with brown sap, compacted into clusters towards the stem-apex, developing filiform processes 1.5-3 µm wide in the lower part of the stem (as on the pileus), these processes often bifid in 2-spored fruit-bodies. Surface of the pileus covered over the centre with a compact palisade with 3 kinds of cell (with intermediates); 1, narrowly

ventricose colourless cells with the cell-body 30-60 x 4-12 µm prolonged into a filiform unbranched, aseptate, tapering process 70-350 x 1.5-3.5 µm, rarely 1-septate, eventually mucifying in old fruit-bodies; 2, large clavate or ventricose hyaline cells 40-70 x 8-20 µm, without a process; 3, small clavate or subcylindric cells 15-40 x 5-12 µm with brown sap, packed between the stalks of the other cells and forming the dense inner part of the palisade, without a gelatinous substratum. Surface of the pileus over the limb with a palisade consisting mostly of large clavate cells with brown sap, the subterminal cells often inflated with brown sap, with a thin gelatinous substratum.

This fungus, which I called *C. radicata* for convenience in 1934, is *C. altissima* Mass, according to the unmistakeable illustration of the type-collection *E.M. Burkill 112* and the specimen in the Singapore herbarium. It comes in the key of Pegler and Young (1986) to sect. *Albotomentosae* where it should come next to the otherwise very dissimilar *O. xeruloides*. A much closer species seems to be *O. japonica* (sect. *Radicatae*) of which v. *colensoi* may be identical. Once, when I was delayed in the town of Goiania in Brazil in January 1968, I found two fruit bodies in different places which seemed identical with *O. altissima*, but I had no means of making a herbarium specimen.

Oudemansiella canarii (Jungh.) v. Hoehn. Figures 3, 7

Pegler and Young (1986) 589.

***Collybia apalosarca* Berk. et Br.; Corner, Trans. Brit. mycol. Soc. 19 (1934) 39-88.**

Pileus 4 mm-15 cm wide, convex then plane, often gibbous, never revolute, sometimes regulose, with a smeary viscid gelatinous pellicle at first spotted with greyish flecks, striate in small specimens, dark umber becoming paler fuscous brown to dirty white when old, rarely pallid white from the first; margin slightly incurved at first, thin, acute, entire. Stem 3 mm-9 cm x 0.5-9 mm at the apex, 1-14 mm at the base, gradually tapered upwards or subcylindric, central to slightly excentric, straight or incurved, thinly pruinose or subvillous, fibrous, solid, apex often subcostate, white or, when young, pale clear yellow, sometimes with pale rufous streaks; base dilated, generally with a narrow ridge or zone round the upper margin, attached by a microscopic root; veil marginal, slight, evanescent. Gills rounded adnate, adnexed or nearly free, often separating free, sometimes with a subdecurrent tooth, more or less ventricose, rather crowded, often broad, thick, waxy to submucilaginous, not veined, 11-39 primaries 1-15 mm wide. 1-5 ranks, white, often with the edge pale clear yellow at first, becoming powdered with the spores and brownish in decay. Flesh 0.5-5 mm thick in the centre of the pileus, 0.3-3 mm thick halfway to the margin, at first firm and fleshy then rather cottony spongy, white, unchanging, with a gelatinous layer 0.3-1 mm thick next the surface of the unexpanded pileus. Smell of fresh fish, sometimes strong.

On dead trunks and branches in the forest and in the open, common. Palaeotropics.

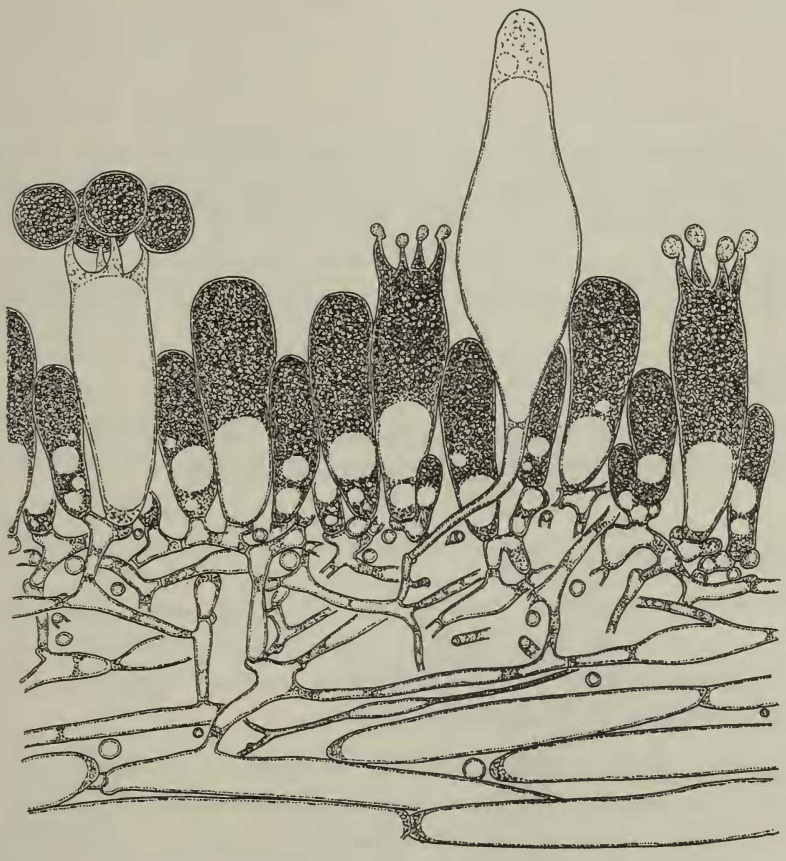


Figure 3. *Oudemansiella canarii.* Hymenium with pleurocystidium and multigittulate basidia, x 500.

Spores 16-23 x 16-22 µm, white in the mass, smooth, subglobose to broadly ellipsoid, wall -0.5 µm thick, densely granular guttulate. Basidia 54-75 x 18-25 µm, monomorphic, densely multiguttulate; sterigmata 4, 5-9 x 3.5-5 µm at the base, stout, arcuate; acerose basidioles none. Cheilocystidia 45-95 x 8-28 µm, mostly 10-15 µm, 2.5-4 µm at the base, clavate, rarely subventricose, often with a long stalk, thin-walled, vacuolate, colourless or in some specimens with yellowish oily masses as exudates. Pleurocystidia 110-280 x 23-40 µm, 10-16 µm at the apex, 3-4.5 µm at the base, very large, broadly fusiform with obtuse apex to ventricose with prolonged subcylindric apex, thin-walled, vacuolate, colourless. Caulocystidia as thin-walled terminal cells 6-17 µm wide with finely vacuolate-reticulate colourless cytoplasm, on lax superficial hyphae, in some specimens with yellowish oily masses as on the gill-edge; basal disc with a lax palisade of uninflated hyphae but the terminal cells 5-8 µm wide and often thinly encrusted with yellowish granules. Surface of the pileus pelliculose with two palisade layers separated by the gelatinous layer; outer palisade consisting of rather laxly arranged, more or less ventricose-appendaged, thin-walled cells 70-200 x 6-11

µm, mostly with pale umber sap, the hypodermic of laxly interwoven hyphae with cells 35-200 x 2-5(-12) µm, this palisade splitting into the greyish flecks on the pileus; inner palisade c. 100 µm high, composed of narrow subcylindric hyphae with cells 25-50 x 2.3-5 µm, in places -6 µm wide, with pale fuscous umber sap. Hyphae clamped except those of the palisades on pileus and stem and of the gelatinous layer of the pileus; in the pileus with cells 60-500 x 8-30 µm and some 3-5 µm uninflated; in the stem with cells 100-1200 x 8-30 µm, a few uninflated, at the base of the stem 5-12 µm wide and densely interwoven, in the basal plug 3-5 µm wide with slightly thickened walls and very densely interwoven.

forma **radicans** Corner (1934)

Stem with a rooting base as a pseudorhiza one to several cm long, from the rotten wood. Frequent with typical specimens in Malaya.

var. **perstipitate** Corner (1934)

Stem without a basal disc, the basal part elongating and bearing an indistinct zone or slight ring (as the remains of the marginal veil) about the middle. Fruit-bodies small, with pileus -5 cm wide, stem -6 cm long. Much less common than the typical state in Malaya.

This description is condensed from the extended account that I gave in 1934. It is the commonest species of the genus in Malesia, and I do not regard it as the same as *O. platensis* of South America for the reasons given under that species. Both are placed in subgen. *Oudemansiella* because of the lack of pseudorhiza but f. *radicans* belies this distinction from subgen. *Xerula*. The veil in both species is so slight that, to be sure of its presence, it is necessary to section the unexpanded primordium.

There occurs on fallen branches in Tjibodas Botanic Garden, Java, a fungus which I class temporarily with f. *radicans* but it requires fuller investigation. The fruit-bodies are rather small with a pinkish to rufous tan pileus and a rather strong sour smell. It agrees with *O. canarii* microscopically except that the outer palisade of the pileus consists of rows of 2-3 or more inflated cells with the terminal cell clavate, in the manner of *O. lianicola*.

Oudemansiella crassifolia sp. nov. Figure 4

Receptacula alba. Pileus 1.2-2.5 cm latus, convexus dein planus, viscidus laevis. Stipes 12-50 x 2.5-3.5 mm, basim abruptum vel subattenuatum versus 2.5-5 mm latus, subfloccosus, apicem versus pruinosus; velo annuloque non viso. Lamellae adnatae rotundatae, subconfertae dein subdistantes, crassae obtusae, acie saepe undulata, 14-28 primariae 2-3 mm latae, ordinibus 2-3. Caro tenuis, sub pilei superficie tenuiter gelatinosa. Sporae 21-28 x 19-24 µm, subglobosae laeves multiguttulatae. Basidia 70-130 x 25-28 µm. Cheilocystidia 55-130 x 13-38 µm, ut in *O. canarii*. Pleurocystidia 105-165 x 30-50 µm, clavata vel ventricosa, copiosa. Superficies pilei strato gelatinoso 300-500 µm crasso, hyphis efibulatis 2-5 µm latis pervaso, haud vallato, hypharum apicibus decumbentibus 3-8 µm latis vel in cellulis sparsis -35 x 16 µm

expansis. Ad lignum emortuum ramulisque solitaria in silva montana. Borneo, Mt. Kinabalu 1700m alt. Typus *RSNB 5483B;* herb. Corner.

var. **incarnata** var. nov.

Differt pileo stipiteque primo pallide incarnato; sporis minoribus 19-24 µm; cheilocystidiis brevioribus 40-65 x 10-38 µm; pilei superficie strato gelatinoso tenuiori 100-150 µm crasso. Ad truncos emortuos *Mangiferae* et *Pini* in silva montana. Malaya, Pahang, Cameron Highland 1500m alt. Typus, *Corner s.n.* 1 Oct. 1966; herb. Corner.

Fruit-bodies entirely white. Pileus 1.2-2.5 cm wide, convex then plane, smooth, with a viscid pellicle. Stem 1.2-5 cm x 2.5-3.5 mm above, 2.5-5 mm below, pruinose upwards, fibrillose and subfloccose downwards to the abrupt or subattenuate base, not discoid; veil and ring none. Gills rounded adnate, rather crowded then subdistant, with a very thick obtuse and often undulate edge, 14-28 primaries 2-3 mm wide, 2-3 ranks. Flesh thin, with a thin gelatinous layer on the upper side.

On dead wood and sticks in the forest, solitary. Borneo, Mt Kinabalu 1700m alt.

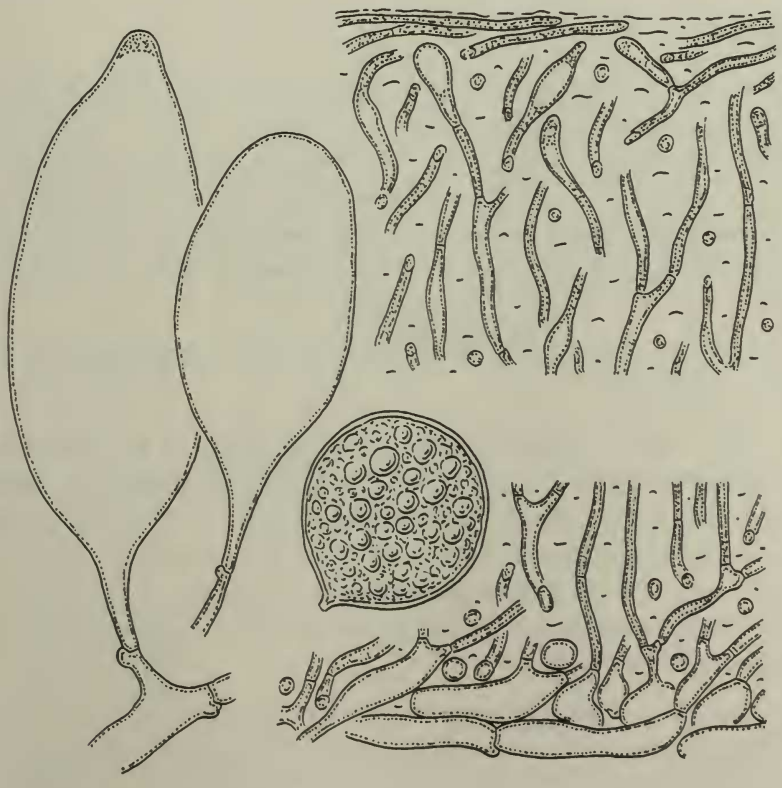


Figure 4. *Oudemansiella crassifolia.* Spore, x 1000. Pleurocystidia and surface of pileus, x 500.

Spores 21-28 x 19-24 µm, subglobose, smooth, multiguttulate. Basidia 70-130 x 25-28 µm, 4-spored; subhymenium -30 µm thick, composed of 2-3 µm hyphae, interwoven, not corticate. Cheilocystidia 55-130 x 13-38 µm, as in *O. canarii*, forming the very thick gill-edge and widest in the transitional zone to the hymenium. Pleurocystidia 105-165 x 30-50 µm, clavate or ventricose with obtuse or scarcely prolonged apex, stalk narrow, abundant, strongly projecting. Hyphae clamped except in the mucilage on the pileus; stem-cells 80-600 x 5-20 µm, cylindric or with tapered ends. Surface of stem with hyphae 3-6 µm wide, here and there entangled into fibrillose flocci, with scattered subclavate ends 5-9 µm wide. Surface of pileus with a gelatinous layer 300-500 µm thick, pervaded by 2-5 µm hyphae without clamps, branching but without forming any palisade, the hyphal ends at the surface more or less shortly decumbent on the mucilage with cylindric to subventricose ends 3-8 µm wide, also with a few scattered clavate cells -35 x 16 µm.

Collections.- Borneo, Mt Kinabalu, Bembangan and Mesilau valleys, 1700m alt.; *RSNB 5060*, 22 Jan. 1964; *RSNB 5483A*, 26 Feb. 1964; *RSNB 5483B*, 12 March 1964; *RSNB 5483C*, 16 March 1964.

var. **incarnata**

Pileus -6 cm wide, convex to plane, smooth, dry, opaque, pale pink, fading white from the centre outwards. Stem 1-1.5 cm x 2-3.5 mm, 3-4.5 mm at the abrupt base, subcylindric, thinly white villous downwards, pale pink then white. Gills adnate, separating free, thick, waxy, subdistant, 14-17 primaries -5 mm wide, 3 ranks, white. Flesh 2-3 mm thick in the centre of the pileus, floccose-tough, with a thin gelatinous layer at the surface, white. Smell rather sour and of cucumber.

On fallen trunks of *Mangifera odorata* and *Pinus sp.* Malaya, Pahang, Cameron Highlands, 1500m alt.

Spores 19-24 µm, subglobose. Basidia 60-88 x 20-24 µm; sterigmata 2-4. Cheilocystidia 40-65 x 10-38 µm, clavate to ventricose, obtuse, not appendaged, thin-walled, smooth, as a thick sterile edge of the gill, often with the subterminal cell or two inflated and ellipsoid to subglobose. Pleurocystidia 120-220 x 22-40 µm as in *O. canarii*, often slightly waisted, wall 0.5 µm thick. Structure as in var. *crassifolia* but the gelatinous layer on the pileus 100-150 µm thick with 3-6(-7) µm hyphase often disarticulating.

The fruit-bodies of this species seem characteristically small and solitary. The pileus has the gelatinous layer on the surface as in *O. canarii* but without distinct palisades unless the primordial pileus may have a single layer of clavate cells. The very thick gills with undulate edge are characteristic. I saw no sign of veil or annulus.

Oudemansiella lianicola sp. nov. Figures 5, 6

Pileus -28 mm latus, convexus siccus, primo furfuraceus subvillosus, in centre valde rugulosoreticulatus, pallide ochraceus centro subferrugineo. Stipes 30-40 x 3-4 mm, ad basim abruptum subbulbosum 5-7 mm, fistulosus, sursum albidus pruinosus, deorsum appresse fibrillosi-subfloccosus brunneus. Velum marginale vix evolutum, annulo nullo. Lamellae adnatae rotundatae subdistantes, haud vel vix venosae, 19-23 primariae 3-5 mm latae, ordinibus 3, albidae dein pallide ochraceae. Caro 3-6 mm crassa in pilei centro, firma, haud gelatinosa, flavidi-albidula. Sporae 10.5-13 x 8.5-9.5 µm, laeves, ellipsoideae multiguttulatae. Basidia 46-58 x 11-12.5 µm. Cheilocystidia 40-100 x 12-28 µm, clavate vel subfusiformia, ut acie lata sterili. Pleurocystidia 50-85 x 18-38 µm, clavate, nonnulla subtruncata, raro submucronata, copiosa. Superficies pilei e cellulis clavatis 70-120 x 15-40 µm, tunicis brunneis, et cellulis 25-70 x 8-38 µm subglobosis, tunicis brunneolis, in seriebus moniliformibus -300 µm longis instructa, sine fibulis. Ad lianos emortuos gregaria vel subcaespitosa, in silva montana. Borneo, Mt. Kinabalu 1400m alt. Typus, *RSNB 5006*; herb. Corner.

Pileus -28 mm wide (not fully expanded), convex, dry, at first furfuraceus subvillous, strongly rugulose reticulate in the centre, minutely furfuraceous towards the substriate incurved margin, pallid bistre ochraceous or tan ochraceous, brownish towards the subferruginous centre. Stem 3-4 cm x 3-4 mm 5-7 mm at the abrupt subbulbous base, slightly attenuate upwards, hollow, fibrillose, whitish and subpruinose upwards, fawn brown and appressedly fibrillose-floccose or subfurfuraceous downwards, the base madder brown subvillous. Veil marginal,

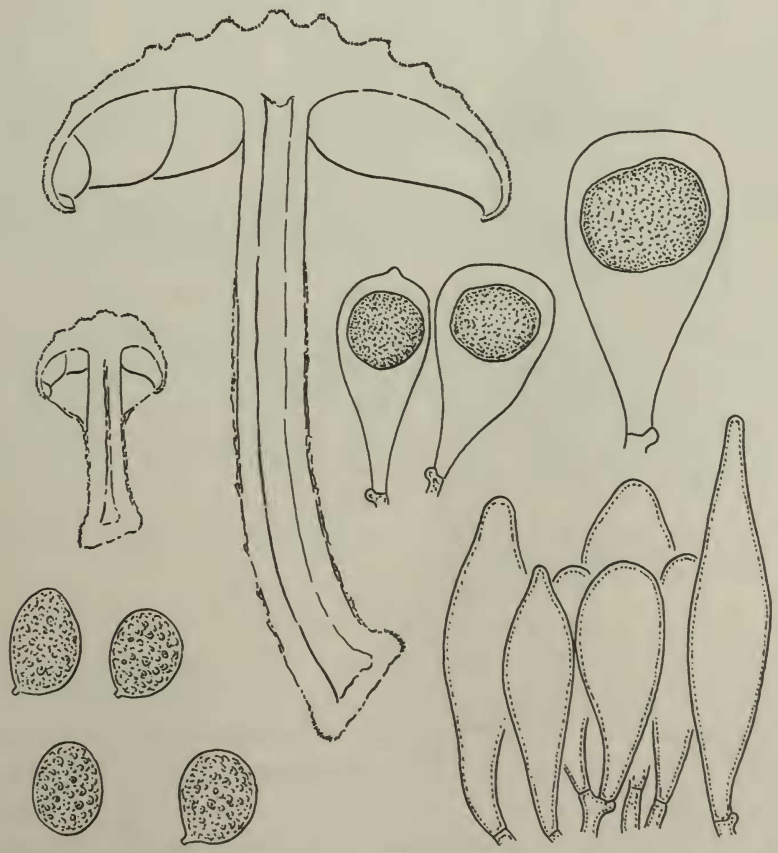


Figure 5. *Oudemansiella lianicola.* Fruit-bodies in section, x 2. Spores, x 1000. Pleurocystidia (above) and cheilocystidia (below), x 500.

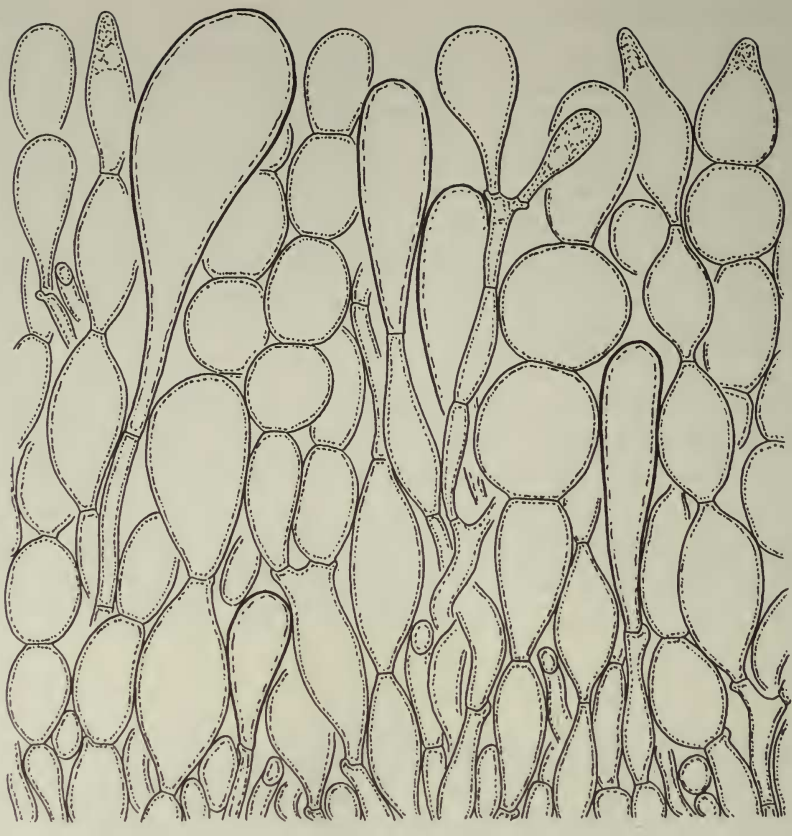


Figure 6. *Oudemansiella lianicola.* Surface of pileus, with several large clavate cells of the orighinal palisade and moniliform cell-rows of incursive hyphae, x 500.

very slight, fibrillar, leaving no trace on the stem. Gills rounded adnate, separating free, subdistant, not or scarcely veined, 19-23 primaries 3-5 mm wide, 3 ranks, cream white to pallid subochraceous. Flesh 3-6 mm thick in the centre of the pileus, rather firm, homogeneous, without a gelatinous layer, pallid yellowish white. Smell slight, subacrid.

On a dead hanging liane, gregarious to subcaespitose. Borneo, Mt Kinabalu, Mesilau 1400m alt, 18 Jan. 1964.

Spores 10.5-13 x 8.5-9.6 µm, white, smooth, ellipsoid, multiguttulate, inamyloid. Basidia 46-58 x 11-12.5 µm, 4-spored; no acerose basidioles; subhymenium narrow, composed of 2-4 µm hyphae, not corticate, becoming submucilaginous. Cheilocystidia 40-100 x 12-28 µm, clavate to subfusiform with obtuse apex, rarely shortly appendaged, thin-walled, smooth, as a broad sterile gill-edge. Pleurocystidia 50-85 x 18-38 µm, clavate, mostly subtruncate, not appendaged or occasionally submucronate, thin-walled smooth, very abundant, (the contents contracting in alcohol-formalin into a granular mass with fine

membrane). Hyphae clamped; in the stem, with cells 70-500 x 5-36 µm or -50 µm wide and then often in moniliform rows at the base of the stem, septa broad and transverse to oblique. Surface of stem with loosely interwoven, longitudinal hyphae 3-12 µm wide, short-celled, with pale brown walls, the end-cells subclavate or subfusiform as on the pileus, these slight caulocystidia here and there loosely clustered into the furfuraceous particles especially towards the base of the stem with a loose tomentum of hyphae c. 200 µm thick. Surface of pileus covered by a fairly compact pile of hyphal ends 200-300 µm high in the centre or the pileus, consisting of large clavate cells 70-120 x 15-40 µm with dark brown walls and more or less moniliform rows of ellipsoid, pyriform or subglobose cells 25-70 x 8-38 µm with pale brown walls, with (and without) clamps; the young pileus covered with the large clavate cells, then on expansion developing the moniliform rows and causing the reticulation in the centre of the pileus; without a gelatinous layer.

The habitat of this fungus seems particular because, if it grew on ordinary wood fallen from trees, I would surely have found it in such places. The pileus develops the trichoderm of *Physocystidium*, though it begins with the hymenioderm as in *O. platensis*.

Oudemansiella mucida (Fr.) v. Hoehn. Figure 10

I have the following notes on English collections:–

Gills slightly veined at the base, 15-26 primaries 4-16 mm wide, 3-6 ranks. Flesh 3-10 mm thick in the centre of the pileus, 1-2 mm halfway to the margin, gelatinous in the gill-trama and at the surface of the pileus. Spores 14-18.5 µm, subglobose, with distinctly thickened wall. Cheilocystidia -95 x 7-12 µm, subfusiform subacute to clavate, rarely subventricose, thin-walled. Pleurocystidia none seen (collapsing), none (Ricken), -200 x 40 µm (Boursier 1926), 90-140(-180) x 15-30(-40) µm (Rea 1922). Surface of pileus with a single palisade of clavate cells 18-35 x 5-10 µm, occasionally obtusely ventricose, rather small, compact, derived from gelatinous hyphae 1.5-2.5 µm wide without clamps (other hyphae with clamps).

I note the account of physiological factors in the development of the fruit-body of this species by Semerdzieva and Musilek (1970).

Oudemansiella platensis Speg. Figure 7

It is now customary to regard this species, described and widely reported from south and tropical America, as identical with *O. canarii* of the Old World. I have seen these fungi commonly in Brazil and Malesia and I am not convinced that they are conspecific even though the fruit-bodies are extremely similar. Thus, I never gathered the Malesian fungus in South America or that in Malesia. They

Figure 7. *Oudemansiella platensis*. (left) and *O. canarii* (right). Outer palisade on surface of pileus, x 500.

differ in the construction of the surface of the pileus which develops an almost pseudoparenchymatous tissue in what I regard as *O. platensis*. Therefore, the greyish flecks, which form from the disruption of this layer on the expansion of the pileus, are thicker and more conspicuous in the American species. I have the following details concerning *O. platensis*:-

Spores 15-25 µm wide, subglobose, wall slightly thickened. Basidia 70-80 x 18-21 µm. Cheilocystidia as in *O. canarii*. Pleurocystidia 170-280 x 30-46 µm,

clavate to ventricose with a long obtuse appendage (as in *O. canarii*). Hyphae clamped except in the surface tissue of pileus and stem, but some collections of fruit-bodies apparently devoid of clamps. Surface of pileus with the double palisade of *O. canarii* but the outer palisade developing into an almost pseudoparenchymatous layer 200-300 µm thick, composed of moniliform rows of ellipsoid to subglobes cells 30-100 x 5-70 µm but smaller towards the surface and with end-cells 10-30 x 5-8 µm, mainly secondarily septate, thin-walled, colourless, this pellicle breaking into the flecks on the gelatinous layer; inner palisade with many clavate cells -40 x 7-15(-20) µm.

Collections from Niteroi, Chavantina and Manaus in Brazil; *Rick 286*, det. *O. platensis*, herb. Mus. Nac. Rio de Janeiro.

The thick superficial layer develops hypodermally from hyphal branches arising below the initial and simple outer palisade the cells of which persist among the stalks of the moniliform rows. Likewise, hyphal branches grow from just below the inner palisade into the gelatinous layer where they may also produce rows of more or less inflated cells before continuing to the outer palisade.

This complicated surface relates with that of *O. lianicola*. There may be another species in Amazonia resembling *O. platensis* but without gelatinous layer to the pileus, which I collected near Manaus 17 October 1948.

O. radicata (Fr.) Singer Figure 1

For this common species I gave the following notes from collections made about Cambridge, England:-

Spores 14-16 x 10-11.5 µm. Cheilocystidia 60-130 x 10-25 µm, clavate to ventricose, obtuse, as a broad sterile gill-edge. Pleurocystidia similar, ventricose, obtuse, mostly capped by an oily brownish globule 10-28 µm wide. Surface of pileus with a single compact palisade of elegantly clavate cells 30-90 x 8-17 µm, with slender stalks, walls -1 µm thick (at least in the stalks), seated on interwoven submucilaginous hyphae 3-7 µm wide, no thick gelatinous layer, no ventricose-filiform pileocystidia. Stem hyphae with cells 250-700 x 5-45 µm (Boekhout and Bas), with broad transverse septa, clamped; some oleiferous hyphae 3-10 µm wide. Caulocystidia clavate, scattered.

Oudemansiella ? radicata var. **hygrophoroides** (Singer et Clemençon) Pegler et Young (1986). Figure 8.

The following description refers to a fungus which I collected in northern Japan and which certainly belongs to the complex of *O. radicata* in Hokkaido (Imai, 1938). However, it presents two problems. First, the presence of long pileocystidia as well as clavate cells in the palisade on the pileus, just as in the Malesian *O. altissima*, raises the question whether it belongs in sect.

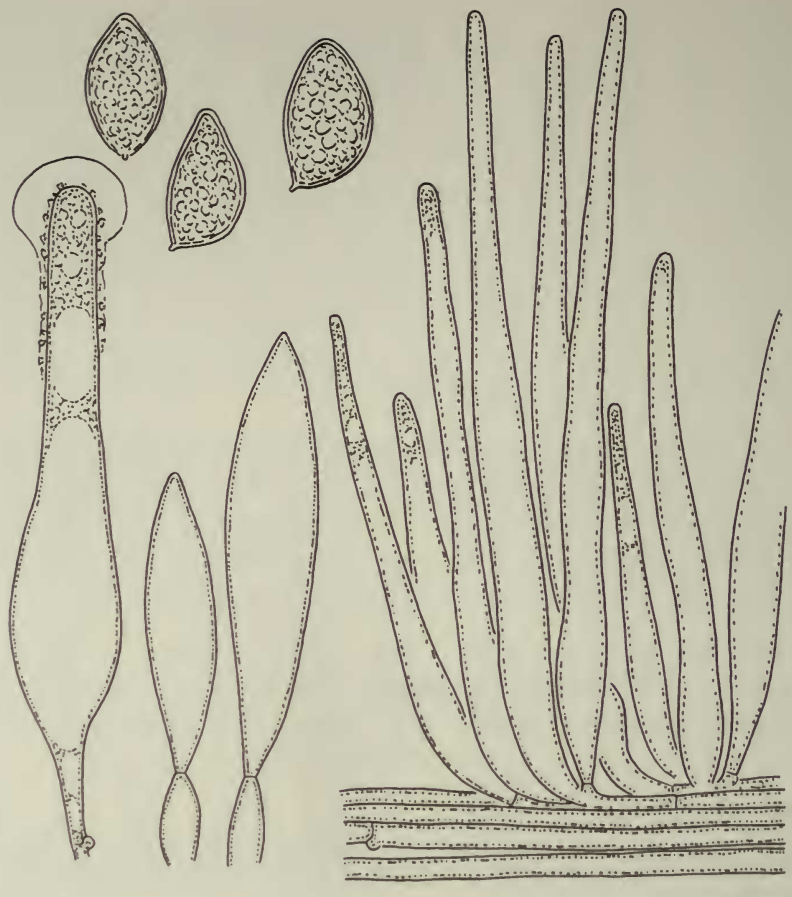


Figure 8. *Oudemansiella? radicata* var. *hygrophoroides* (from Japan). Spores, x 1000. Cheilocystidia and pleurocystidium, x 500. Caulocystidia in a cluster, x 500.

Albotomentosae or sect. *Radicatae*. If referred to the former, it does not fit any known species; if to the latter, it comes out as the European *O. radicata* var. *hygrophoroides*. It has the spores of *Xerula megalospora* Redhead, Ginns et Shoemaker but not its capitate cystidia. Second, there are scattered among the immature clavate basidia fusiform to subacerose basidioles which are one of the marasmioid features of *Xerula longipes*. I have never seen such basidioles in other species of *Oudemansiella*, to which genus all other features of its fruit-body conform.

Fruit-bodies as those of *O. radicata* with viscid regulose pileus 2-10 cm wide; stem finely brown scurfy from minute clusters of hairs. Rooting in the forest. Hokkaido, pr. Yamabe, 18 Sept. 1966.

Spores 16-19.5 x 9.5-11.5 µm, mango-shaped, even subapiculate, smooth, rather thin-walled, oily opalescent (alc. formalin material). Basidia 46-58 x 10-13 µm; sterigmata (3-)4, 7.5-9.5 µm long; acerose basidioles scattered among the

young basidia. Cheilocystida 60-120 x 14-26 µm, ventricose, acute, not appendaged, thin-walled, but in some cases with the apex thinly oily-granular encrusted, as a sterile gill-edge. Pleurocystidia 90-160 x 18-28 µm, ventricose with prolonged subcylindric obtuse appendage 7-16 µm wide, more or less thickly oily-encrusted over the appendage, often with a brown oily resinous apical globule, thin-walled. Hyphae clamped, in the stem -14 µm wide and long-celled. Surface of stem with clusters of subcylindric or gradually tapering caulocystidia 40-220 x 6-13 µm, simple, aseptate, with smooth and firm or slightly thickened walls, the obtuse apex 3-6 µm wide, arising in clusters from the ends of 1-3 hyphae. Surface of the pileus with a palisade of clavate cells 40-70 x 8-20 µm, thin-walled or the stalks slightly thick-walled and apparently buried in mucilage, also many pileocystidia similar to the caulocystidia but narrower, 5-8 µm with the apex 3-5 µm, rarely -16 µm.

Oudemansiella raphanipes (Berk.) Pegler et Young (1986)

***O. brunneomarginata* L. Vassiljeva; Endo and Hongo, Trans. mycol. Soc. Japan 17 (1976) 345, f.1; Yokoyama, Fungi of Japan (1989) 121; Imazeki and Hongo, Coloured Illustrations of mushrooms of Japan (1987) f. 154.**

Pegler and Young give *O. brunneomarginata* as a synonym of *O. raphanipes* in sect. *Radicatae* of subgen. *Xerula*. This subgenus was defined in Pegler and Young's key as comprising fruit-bodies arising from a pseudorhiza growing from buried roots. *O. raphanipes* was distinguished in their key by the minute reflexed squamules on the stem. Yet, the Japanese fungus described and illustrated by the Japanese authors, grows on dead trunks of *Acer mono* with a pseudorhiza evidently penetrating the rotten wood, much as in *O. canarii* f. *radicans*, and it does not appear to have the recurved squamules on the stem. Whatever the true identity of the Japanese fungus may be, it transgresses the distinction in habit between the two subgenera.

Oudemansiella steffenii (Rick) Singer Figure 9

Lilloa 26(1953) 66; Pegler and Young (1986) 599.

***O. echinospora* Singer, Mycologia 37 (1945) 439.**

Pileus 3-13 cm wide, convex to plane, opaque, dry, very smooth or radially rugulose towards the striate margin, fuscous fuliginous then fuscous ochraceous to fuscous bistre over the limb. Stem 6-16 cm x 3-10 mm upwards, 4-20 mm at ground level, white and fuliginous scurfy pruinose or fibrillose to more or less entirely fuliginous; rooting base rather short or up to 15 cm long. Veil and ring not formed. Gills adnexed, scarcely crowded, c. 25 primaries 4-11 mm wide, 3 ranks, white with pale fuscous edge. Flesh 3-10 mm thick in the centre of the pileus, firmly fleshy, without a gelatinous layer.

On the ground in forest, mostly solitary. South America.

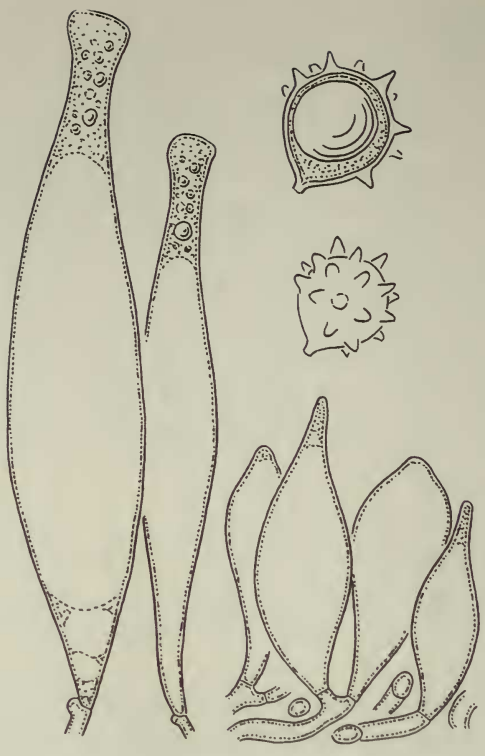


Figure 9. *Oudemansiella steffenii*. Spores, x 1000. Pleurocystidia (large) and pileocystidia, x 500.

Spores 11-15 µm wide (spore-body), white, subglobose, varying rather sparsely to closely verrucose to echinulate with conical, obtuse to acute, warts 1.5-3 x 1-1.5 µm, thin-walled, guttate, inamyloid. Basidia 65-80 x 18-24 µm, evidently dimorphic; sterigmata (2-3-)4. Cheilocystidia 40-75 x 15-30 µm, clavate, thin-walled, smooth, with fuscous sap, as a sterile gill-edge. Pleurocystidia 100-180 x 25-35 µm, ventricose-fusiform, often with subcapitate to subtruncate apex 13-17 µm wide, thin-walled, smooth. Caulocystidia as in *O. canarii* but with fuscous sap as in many superficial hyphae of the stem. Surface of pileus with a single palisade of clavate to ventricose cells 45-75 x 15-30 µm, thin-walled, with fuscous sap, arising from a firm layer of narrow, interwoven hyphae with fuscous sap, without a gelatinous layer, without long pileocystidia. All hyphae in the fruit-body with clamps.

These are my notes on the fungus as I found it, rather commonly, in Brazil.

Oudemansiella submucida sp. nov. Figure 10

Pileus 1-10 cm latus, convexus dein planus, glutinoso-pelliculosus laevis, albus dein subochraceus, marginem versus substriatus. Stipes 1.5-7 cm x 1.5-10 mm, ad basim vix incrassatus, fibrosus firmus siccus, primo subfloccoso-fibrillosus, albus dein subochraceus; annulo 2-6 mm lato, prope stipitis apicem, membranaceo pendenti albo, etiam aliquando deficienti. Lamellae adnexae vel

adnatae, ventricosae subdistantes crassae ceraceae puberulae, haud venulosae, primariae 16-28 2-14 mm latae, ordinibus 3, albae. Caro 2-10 mm crassa in pilei centro, hygrophana, ad auperficiem tenuiter glutinoso-pelliculosa, alba. Sporae 18-25 x 17.5-23 µm, subglobosae laeves. Cheilocystidia et pleurocystidia ut in *O. canarii*. Pellicula pilei e cellulis clavatis 25-35 x 15-25(-30) µm, e strato subgelatinoso angusto orientibus, instructa. Ad truncos delapsos in silva montana. Borneo, Mt. Kinabalu c. 1700m alt. Typus, *RSNB 5201*; herb. Corner.

Figure 10. *Oudemansiella mucida* (left) and *O. submucida* (right). Spores of pileus, x 500.

var. **persicca** var. nov.

Differt pileo sicco sine strato mucilaginoso, etiam pilei hymeniodermate laxe evoluto. Borneo, Mt. Kinabalu, Mesilau 1700m alt., Aprile 1964. Typus, *RSNB 5201A*; herb. Corner.

Pileus 1-10 cm wide, convex then plane, smeary viscid, pelliculose, smooth, without flecks of veil, white to pale butter ochraceous, substriate towards the margin. Stem 1.5-7 cm x 1.5-10 mm, base slightly thickened, fibrous, firm, dry, at first slightly floccose-fibrillose, white then pale butter ochraceous from below upwards. Ring 2-6 mm wide, near the stem-apex, membranous, pendent, collapsing, white, but some specimens without the ring. Gills adnexed to adnate, subdistant, not veined, thick, waxy, puberulous, 16-28 primaries 2-14 mm wide, 3 ranks, white. Flesh 2-10 mm thick in the centre of the pileus, hygrophanous, thinly viscid-gelatinous at the surface but bounded by a pellicle, no conspicuous gelatinous layer, white.

On fallen trunks in montane forest. Borneo, Mt. Kinabalu.

Spores 18-25 x 17.5-23 µm, white, subglobose, smooth, wall slightly thickened. Cheilocystidia and pleurocystidia as in *O. canarii*. Hyphae clamped except those in the pellicle of the pileus; in the stem with cells 90-850 x 5-34 µm, the longer

often tapered; in the pileus -45 µm wide and rather spindle-shaped; in the ring 3-8 µm wide, unspecialised. Pellicle on the pileus composed of a fairly compact palisade of smooth, more or less clavate, cells 25-35 x 15-25(-30) µm, seated on a narrow subgelatinous layer of hyphae 2-4 µm wide and without clamps.

Collections.- Borneo, Mt Kinabalu, Tenompok, 8 Sept. 1961, *RSNB 2890*; Mesilau 2 Feb. 1964, *RSNB 5201*.

This species comes between *O. canarii* and *O. mucida*, having the fruit-body and surface structure of the pileus as in *O. mucida* and the large spores and cystidia of *O. canarii*. It differs from *O. mucida*, also, in the dry stem and larger clavate cells on the pileus. The dryness is emphasized by var. *persicca*.

References

Boekhout, T. and C. Bas (1986). Notulae ad floram agaricinam neerlandicam - XII. Some notes on the genera *Oudemansiella* and *Xerula*. *Persoonia* 13: 45-56.

Bon, M. (1975). Agaricales de la cote atlantique française. *Doc. Mycol.* IV, fasc. 17: 1-40.

Boursier, M. (1926). Note sur le genre *Mucidula* Pat. *Bull. Soc. Mycol.* Fr. 40: 332-333.

Buller, A.H.R. (1924). Researches on Fungi III. Longmans, Green & Co., London, New York, Toronto.

— (1931). *Researches on Fungi IV.* Longmans, Greens & Co., London, New York, Toronto.

Corner, E.J.H. (1947). Variation in size and shape of spores, basidia and cystidia in Basidiomycetes. *New Phytologist* 46: 195-228.

— (1981). The Agaric genera *Lentinus*, *Panus* and *Pleurotus*. *Nova Hedwigia Beih.* 69.

— (1984). Ad Polyporaceas II. *Nova Hedwigia Beih.* 78.

— (1991). *Trogia* (Basidiomycetes). *Gard. Bull. Sing.*, Suppl. 2. Singapore

Corner, E.J.H. (1994). On *Hohenbuehelia* (Agaricales). Gard. Bull. Sing. 46(1): 1-31.

Imai, S. (1938). Studies on the Agaricaceae of Hokkaido, *I. J. Fac. Agric.*, Hokkaido Imp. Univ. 43, pt. 1: p. 115.

Jülich, W. (1981). Higher taxa of Basidiomycetes. *Bibliotheca Mycologica* 85.

Kobayasi, Y., Y. Otani and T. Hongo (1973). Some higher fungi found in New Guinea. *Rept. Tottori Mycol. Inst.* (Japan) b. 10.

Lange, J.E. (1936), Flora Agaricina Danica, II: 9.

Pegler, D.N. (1986). Agaric flora of Sri Lanka. *Kew Bull. Add. Ser.* XII.

— and T.W.K. Young (1986). Classification of *Oudemansiella* (Basidiomycota: Tricholomataceae). *Trans. Brit. Mycol. Soc.* 87: 583-602.

Rea, C. (1922). *British Basidiomycetae*. Cambridge University Press.

Redhead, S.A. (1987). The Xerulaceae (Basidiomycetes), a family with sarcodimitic tissues. *Can. J. Bot.* 65: 1551-1562.

Redhead, S.A., J. Ginns and R.A. Shoemaker (1987). The *Xerula* (*Collybia*, *Oudemansiella*) *radicata* complex in Canada. *Mycotaxon* 30: 357-405.

Reijnders, A.F.M. (1948). Etudes sur le developpement et l' organisation histologique des carpophores dans les Agaricales. *Rec. Trav. Bot. Neerlandais* 41: 213-396.

— (1952). Recherches sur le developpement des carpophores dans les Agaricales. Verh. Kön. Nederl. Akad. Wetensch. Natuurkund., ser. 2, 48 n. 4; 1-116.

Romagnesi, H. (1940). *Mycenella* et *Xerula*. *Bull. Soc. Mycol. Fr.* 56: 61-65.

Romagnesi, H. (1977). Sur la multiplication excessive des genres en mycologie. *Bull. Soc. Mycol. Fr.* 93: 248, 254.

Sathe, A.V. and J. Daniel (1980). *Agaricales (Mushrooms) of South West India.* Maharashtra Association for the Cultivation of Sciences, Research Institute, Monograph 1. Pune, India.

Semerdzieva, M. and V. Musilek (1970). Wachstum und Entwickelung des Basidiomyzeten *Oudemansiella mucida*. *Ceska Mykologia* 24: 44-53.

Singer, R. (1975), *The Agaricales in modern taxonomy*. J. Cramer, Vaduz.

Plate 1. *Oudemansiella altissima.* Specimens from Singapore.

On the Agaric Genera *Hohenbuehelia and Oudemansiella*
Index to Parts I and II